

GAC CORDILLERAN SECTION

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Exploration Series “Early Stage Active Projects”

Tuesday March 21, 2017

8:00 am: Registration – Networking

8:20 am: Presentation begins

Discovery Center, Geological Survey of Canada

1500 - 605 Robson Street, Vancouver, BC

Cost: \$5 – Pay at Door – Coffee & muffins provided

RSVP: space is limited; please pre-register by email at: talks@gac-cs.ca

The Wernecke Breccias, Yukon Mega-breccias formed from the venting of hydrothermal fluid

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Discussion Leader: Jacob Verbaas, PhD candidate, Simon Fraser University,
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The Wernecke Breccias are a set of 1.599 Ga hydrothermal breccias in Yukon, northern Canada. The breccias occur over an area of 300 x 150 km and crosscut previously deformed and metamorphosed rocks of Paleoproterozoic age. They are intensely altered and host iron oxide copper and gold (IOCG) mineralization. The breccias have been correlated with the giant Olympic Dam deposit in Australia. Many breccia zones contain clasts of unconsolidated surface sediments and wallrock up to 800 metres in size that foundered kilometres into the breccia. Concurrent igneous rocks are not exposed and the breccias have been regarded as amagmatic. Despite significant industry and academic interest the exact processes that formed the Wernecke Breccia are unclear. Previously proposed models include formation by mud diapirism, salt tectonics and surging hydrothermal fluids. We outline field relations and structural and chemical boundary conditions for breccia formation. Previously proposed and new models are evaluated. We conclude that the breccias formed from surging hydrothermal fluids with a significant gaseous component (possibly CO₂ and/or N₂). Carbonatitic melts at depth may have provided a source of CO₂. Upon venting, the gas expanded and caused extensive brecciation. A hydrous phase, that may have been a mixture of metamorphic, formational, and meteoric waters, subsequently altered the breccia zones.

A summary of the work and results, intended to stimulate discussion of future efforts on the project, will be presented.

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